

**DELAYED STORAGE OF COOKIES WITH APPROVAL CAPABILITY****BACKGROUND OF THE INVENTION****5 1. Technical Field:**

The present invention relates generally to an improved data processing system. Still more particularly, the present invention relates to the storage of cookie files on a user's computer system.

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**2. Description of Related Art:**

The Internet, also referred to as an "internetwork", is a set of computer networks, possibly dissimilar, joined together by means of gateways that handle data transfer and the conversion of messages from protocols of the sending network to the protocols used by the receiving network (with packets if necessary). When capitalized, the term "Internet" refers to the collection of networks and gateways that use the TCP/IP suite of protocols.

20 The Internet has become a cultural fixture as a source of both information and entertainment. Many businesses are creating Internet sites as an integral part of their marketing efforts, informing consumers of the products or services offered by the business or providing  
25 other information seeking to engender brand loyalty. Many federal, state, and local government agencies are also employing Internet sites for informational purposes, particularly agencies, which must interact with virtually all segments of society such as the Internal Revenue  
30 Service and secretaries of state. Providing informational guides and/or searchable databases of online public records may reduce operating costs. Further, the Internet

is becoming increasingly popular as a medium for commercial transactions.

Currently, the most commonly employed method of transferring data over the Internet is to employ the World Wide Web environment, also called simply "the Web". Other Internet resources exist for transferring information, such as File Transfer Protocol (FTP) and Gopher, but have not achieved the popularity of the Web. In the Web environment, servers and clients effect data transaction using the Hypertext Transfer Protocol (HTTP), a known protocol for handling the transfer of various data files (e.g., text, still graphic images, audio, motion video, etc.). The information in various data files is formatted for presentation to a user by a standard page description language, the Hypertext Markup Language (HTML). In addition to basic presentation formatting, HTML allows developers to specify "links" to other Web resources identified by a Uniform Resource Locator (URL). A URL is a special syntax identifier defining a communications path to specific information. Each logical block of information accessible to a client, called a "page" or a "Web page", is identified by a URL. The URL provides a universal, consistent method for finding and accessing this information, not necessarily for the user, but mostly for the user's Web "browser". A browser is a program capable of submitting a request for information identified by an identifier, such as, for example, a URL. A user may enter a domain name through a graphical user interface (GUI) for the browser to access a source of content. The domain name is automatically converted to the Internet Protocol (IP) address by a domain name system (DNS), which is a service that translates the symbolic name entered by the user into an IP address by looking up the domain name

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in a database. The HTML file also contains data, which may not be displayed at the browser. This "hidden" data may be used to store information or execute programs without the user's knowledge of the existence or purpose  
5 of the information or program.

A hidden data field, which may be included in the HTTP header of an HTML file, is a "cookie" data field. A cookie is an HTTP protocol header document element, which may be used to provide multiple data elements to the  
10 browser. Server sites do one of three things: (1) does not send cookies; (2) sends transient cookies; and (3) sends persistent cookies. Some cookies may be specified by the server site as persistent, implying that they will be stored on the user's hard drive and remain available  
15 even if the user closes the browser or reboots the machine. Other cookies are transient and will only persist while the current browser session is open. In response to receiving an HTML file with a cookie, the browser may store the cookie data elements in a file,  
20 which are usually kept in a profile directory for the browser. Also, a different cookie file may be present for each user profile (e.g. each person in a family can have their own profile on the same computer with their own cookie file). These cookie data elements are also  
25 referred to as "cookies". Once a cookie is sent to the browser computer, the server expects the cookie to be returned in the HTTP header of subsequent messages sent from the browser to the server. The inclusion of the cookie in the HTTP header of messages from the browser is  
30 done without the user's awareness. In this manner, the operator of the server may identify repeat visitors to the server site.

The Internet also is widely used to transfer

applications to users using browsers. With respect to commerce on the Web, individual consumers and businesses use the Web to purchase various goods and services. Some companies offer goods and services solely on the Web while others use the Web to extend their reach. A cookie provides a way for a Web site to keep track of a user's patterns and preferences, and potentially store the cookie on the user's computer. The storage of a cookie may be the unauthorized storage of data on another user's computer. The cookie may be used for tracking the user and his or her requests for information from the server site without the user's knowledge or permission.

Browsers typically accept all cookies as a default option. A browser also may allow a user to disable the acceptance of cookies entirely. The browser may include an option to determine whether to accept cookies. While this option disables the acceptance of cookies, this option does notify a user that a cookie was detected. A browser may also accept all cookies, but only return cookies to the originating site. Browsers also have an "ask me each time" option. This option asks a user whether to accept a cookie every time a cookie is presented for acceptance. This option, however, becomes tiresome quickly. A user may receive three or four pop-ups on every Web page in which a yes or no response is required.

Some Web sites may not function properly when the acceptance of cookies is disabled by the browser. Therefore, a user may not be able to access a Web site without having cookies accepted by the browser.

The user basically has two options: 1) disable cookies and then not be able to talk to a vast number of Web sites (many of which the user trusts and does not

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care if cookies are sent) or 2) enable cookies and get all of the downside of cookies.

Therefore, it would be advantageous to have an improved method and apparatus for managing acceptance and storage of cookies on a data processing system.

**SUMMARY OF THE INVENTION**

- 5       The present invention provides a method, apparatus,  
and computer instructions for managing cookies in a data  
processing system. A cookie is received during a browser  
program session. The cookie is only stored in a  
temporary data store within the data processing system  
10 for a duration of the browser program session. The  
cookies stored in the temporary data store may be  
displayed in response to a signal to terminate the  
browser program session. Cookies are selectively stored  
in a persistent storage, based on user input.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

**Figure 1** is a pictorial representation of a data processing system in which the present invention may be implemented in accordance with a preferred embodiment of the present invention;

**Figure 2** is a block diagram of a data processing system in which the present invention may be implemented;

**Figure 3** is a block diagram of a browser program in accordance with a preferred embodiment of the present invention;

**Figure 4** is a diagram of components used in managing receipt and storage of cookies in accordance with a preferred embodiment of the present invention;

**Figure 5** is a menu displaying a list of cookies in which the present invention may be implemented;

**Figure 6** is a flowchart of process for managing receipt of cookies in accordance with a preferred embodiment of the present invention; and

**Figure 7** is a flowchart of method for processing cookies in accordance with a preferred embodiment of the present invention.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

With reference now to the figures and in particular  
5 with reference to **Figure 1**, a pictorial representation of  
a data processing system in which the present invention  
may be implemented is depicted in accordance with a  
preferred embodiment of the present invention. A  
computer **100** is depicted which includes a system unit  
10 **102**, a video display terminal **104**, a keyboard **106**,  
storage devices **108**, which may include floppy drives and  
other types of permanent and removable storage media, and  
mouse **110**. Additional input devices may be included with  
personal computer **100**, such as, for example, a joystick,  
15 touchpad, touch screen, trackball, microphone, and the  
like. Computer **100** can be implemented using any suitable  
computer, such as an IBM RS/6000 computer or  
IntelliStation computer, which are products of  
International Business Machines Corporation, located in  
20 Armonk, New York. Although the depicted representation  
shows a computer, other embodiments of the present  
invention may be implemented in other types of data  
processing systems, such as a network computer. Computer  
**100** also preferably includes a graphical user interface  
25 that may be implemented by means of systems software  
residing in computer readable media in operation within  
computer **100**.

With reference now to **Figure 2**, a block diagram of a  
data processing system is shown in which the present  
30 invention may be implemented. Data processing system **200**  
is an example of a computer, such as computer **100** in  
**Figure 1**, in which code or instructions implementing the

processes of the present invention may be located. Data processing system **200** employs a peripheral component interconnect (PCI) local bus architecture. Although the depicted example employs a PCI bus, other bus architectures such as Accelerated Graphics Port (AGP) and Industry Standard Architecture (ISA) may be used. Processor **202** and main memory **204** are connected to PCI local bus **206** through PCI bridge **208**. PCI bridge **208** also may include an integrated memory controller and cache memory for processor **202**. Additional connections to PCI local bus **206** may be made through direct component interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **210**, small computer system interface (SCSI) host bus adapter **212**, and expansion bus interface **214** are connected to PCI local bus **206** by direct component connection. In contrast, audio adapter **216**, graphics adapter **218**, and audio/video adapter **219** are connected to PCI local bus **206** by add-in boards inserted into expansion slots. Expansion bus interface **214** provides a connection for a keyboard and mouse adapter **220**, modem **222**, and additional memory **224**. SCSI host bus adapter **212** provides a connection for hard disk drive **226**, tape drive **228**, and CD-ROM drive **230**. Typical PCI local bus implementations will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **202** and is used to coordinate and provide control of various components within data processing system **200** in **Figure 2**. The operating system may be a commercially available operating system such as Windows 2000, which is available from Microsoft Corporation. An object oriented programming system such as Java may run in conjunction with the

operating system and provides calls to the operating system from Java programs or applications executing on data processing system 200. "Java" is a trademark of Sun Microsystems, Inc. Instructions for the operating system, the object-oriented programming system, and applications or programs are located on storage devices, such as hard disk drive 226, and may be loaded into main memory 204 for execution by processor 202.

Those of ordinary skill in the art will appreciate that the hardware in **Figure 2** may vary depending on the implementation. Other internal hardware or peripheral devices, such as flash ROM (or equivalent nonvolatile memory) or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 2**. Also, the processes of the present invention may be applied to a multiprocessor data processing system.

For example, data processing system 200, if optionally configured as a network computer, may not include SCSI host bus adapter 212, hard disk drive 226, tape drive 228, and CD-ROM 230, as noted by dotted line 232 in **Figure 2** denoting optional inclusion. In that case, the computer, to be properly called a client computer, must include some type of network communication interface, such as LAN adapter 210, modem 222, or the like. As another example, data processing system 200 may be a stand-alone system configured to be bootable without relying on some type of network communication interface, whether or not data processing system 200 comprises some type of network communication interface. As a further example, data processing system 200 may be a personal digital assistant (PDA), which is configured with ROM

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and/or flash ROM to provide nonvolatile memory for storing operating system files and/or user-generated data.

5 The depicted example in **Figure 2** and above-described examples are not meant to imply architectural limitations. For example, data processing system **200** also may be a notebook computer or hand held computer in addition to taking the form of a PDA. Data processing system **200** also may be a kiosk or a Web appliance.

10 The processes of the present invention are performed by processor **202** using computer implemented instructions, which may be located in a memory such as, for example, main memory **204**, memory **224**, or in one or more peripheral devices **226-230**.

15 Turning next to **Figure 3**, a block diagram of a browser program is depicted in accordance with a preferred embodiment of the present invention. A browser is an application used to navigate or view information or data in a distributed database, such as the Internet or  
20 the World Wide Web.

In this example, browser **300** includes a user interface **302**, which is a graphical user interface (GUI) that allows the user to interface or communicate with browser **300**. This interface provides for selection of  
25 various functions through menus **304** and allows for navigation through navigation **306**. For example, menu **304** may allow a user to perform various functions, such as saving a file, opening a new window, displaying a history, and entering a URL. Navigation **306** allows for a  
30 user to navigate various pages and to select web sites for viewing. For example, navigation **306** may allow a user to see a previous page or a subsequent page relative

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to the present page. Preferences such as those illustrated in **Figure 3** may be set through preferences **308**.

Communications **310** is the mechanism with which  
5 browser **300** receives documents and other resources from a network such as the Internet. Further, communications **310** is used to send or upload documents and resources onto a network. In the depicted example, communication **310** uses HTTP. Other protocols may be used depending on  
10 the implementation. The mechanism of the present invention may be implemented as processes within communication **310** to manage cookies as they are received for storage from sources, such as Web sites that send documents and other content to a user of browser **300**.

15 Documents that are received by browser **300** are processed by language interpretation **312**, which includes an HTML unit **314** and a JavaScript unit **316**. Language interpretation **312** will process a document for presentation on graphical display **318**. In particular,  
20 HTML statements are processed by HTML unit **314** for presentation while JavaScript statements are processed by JavaScript unit **316**.

Graphical display **318** includes layout unit **320**, rendering unit **322**, and window management **324**. These  
25 units are involved in presenting web pages to a user based on results from language interpretation **312**.

Browser **300** is presented as an example of a browser program in which the present invention may be embodied. Browser **300** is not meant to imply architectural  
30 limitations to the present invention. Presently available browsers may include additional functions not shown or may omit functions shown in browser **300**. A browser may

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be any application that is used to search for and display content on a distributed data processing system. Browser 300 make be implemented using known browser applications, such as Netscape Navigator or Microsoft Internet Explorer. Netscape Navigator is available from Netscape Communications Corporation while Microsoft Internet Explorer is available from Microsoft Corporation.

The present invention accepts all cookies with an only-return-to-originator option if desired. The browser will basically tell the server that it is accepting and storing all persistent cookies on the hard drive. Thus, the server sees no difference. The browser, however, does not actually write these persistent cookies to the file until later. The user may then view the list of cookies that are scheduled to be written and choose to save or discard them. If the browser closes before writing the cookies, they are all discarded. Not writing cookies simply makes the server think the user is a first-time visitor the next time the user visits that site, which likely is the precise intent of the user.

With reference to **Figure 4**, a diagram of components used in managing receipt and storage of cookies is depicted in accordance with a preferred embodiment of the present invention. The browser issues a request to a server and the server responds with a response. The response may contain a cookie, and the accepted protocol is that the browser will dutifully keep up with that cookie (either permanently or temporarily as specified by the type of cookie). Response 400 may be sent to browser 402. In these examples, response 400 is a HTTP response made in response to browser 402. When response 400 contains cookie 404, cookie 404 may be stored in permanent

storage 406 or in temporary memory 408. In these examples, memory 408 is system memory in a data processing system, such as main memory 204 in Figure 2. Memory 408 is used as a temporary data store in these examples. When  
5 stored in permanent storage 406, cookie 404 is typically placed in a file, such as cookie file 410 for use by browser 402. Permanent storage 406 may take various forms depending on the implementation, such as, for example, hard disk drive, an optical disc, or a flash memory.

10 Normally, browser 402 receives a request, such as response 400 to accept cookie 404. Upon accepting cookie 404, this cookie is normally placed into cookie file 410 as well as in temporary memory 408 for use during the session in which the user makes requests through browser  
15 402 for various content, such as Web pages, audio files, or images. A session is the time from which browser 402 starts execution to the time at which browser 402 terminates execution.

The present invention provides a method, apparatus,  
20 and computer implemented instructions for handling cookies received at browser 402. This invention does not address the transient cookies, only the persistent cookies. The mechanism of the present invention accepts all cookies presented to browser 402 without saving all of the cookies  
25 in permanent storage 406. The cookies are stored in temporary memory 408 in this example for use while browser 402 is executing. When execution of browser 402 is to be terminated all cookies within temporary storage are presented to a user. Selected cookies may be stored in  
30 cookie file 410 within permanent storage 406 in response to a user input selecting these cookies for retention. Other cookies within temporary memory 408 are discarded.

With reference to **Figure 5**, a menu displaying a list of cookies is shown in which the present invention may be implemented. Menu **500** includes check boxes **502-510** associated with fields **512-520** with each field identifying a cookie that has been received during the current session. In these examples, the identifications of cookies in fields **512-520** are obtained from the URLs for the source of the cookies. Of course other identifiers may be used depending on the particular implementation.

10 In this example, the user accepts a cookie that has been passed to the user's computer system by entering a mark in a check box next to the cookie to be permanently stored. Cookies not marked by the user in menu **500** are discarded. In this manner, the user is able to store the selected cookies and disregard the rest of the cookies. The user may decide to save all of the cookies, some of the cookies, or none of the cookies through menu **500**. When the user has finished making selections in menu **500**, those selections may be accepted by pressing "Okay" button **522**. The selections may be discarded by pressing "Cancel" button **524**.

Turning to **Figure 6**, a flowchart of a process for managing receipt of cookies is depicted in accordance with a preferred embodiment of the present invention. The process illustrated in **Figure 6** may be implemented in a browser, such as browser **300** in **Figure 3**.

During the current session, a determination is made as to whether a cookie has been received (step **600**). If a cookie is not received, the process returns to step **600**. When a cookie is received, the cookie is prevented from being permanently stored in a cookie file (step **602**). The cookie is stored in a temporary storage, such as a

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temporary file or temporary memory 408 in **Figure 4**. In these examples, the cookie is not stored in a file normally used to retain cookies for the browser. The cookie is tagged as accepted (step 606). A protocol is present that is used by the browser/server to determine capabilities. However, once the capabilities have been established and the browser has indicated that it accepts cookies, then the server simply sends them with the understanding that the browser is going to handle them.

10 This handling of the cookie allows for it to be used in requests made to a Web site, dependent upon that cookie, to operate properly. A determination is made as to whether the current session has been requested to be terminated (step 608). The session terminates when the

15 execution of the browser ends. Execution of the browser ends, in these examples, when the user clicks "close". If the current session is not in the act of being terminated, process returns to step 600 as described above.

Otherwise, the cookies are processed (step 610). Step 610

20 happens once the browser has requested to close the session, but before the browser is actually terminated. The processing of the cookies involves presenting received cookies to the user to determine which cookies, if any, should be retained. The user may request to process the

25 cookie list at any time and continue to use the browser afterwards. Closing the browser forces the processing of the cookies using the mechanism of the present invention. A user option is present to initiate these processes at any other time.

30 As represented in **Figure 7**, a flowchart of a method for processing cookies is depicted in accordance with a preferred embodiment of the present invention. The

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process depicted in **Figure 7** is a more detailed description of step **610** in **Figure 6**.

The process begins by generating a list of cookies received in the current session (step **700**). The list of cookies from the current session is displayed to the user (step **702**). User input is received to indicate which cookies to store in a permanent storage, such as permanent storage **406** in **Figure 4** (step **704**). The cookies marked for permanent storage, as depicted in **Figure 5**, are identified (step **706**). The identified cookies are then saved in permanent storage, a cookie file, database, registry, or wherever the browser stores persistent data (step **708**). Cookies that are not marked for permanent storage are discarded (step **710**) with the process terminating thereafter.

Thus, the present invention provides a method, apparatus, and computer implemented instructions to delay the permanent storage of cookies received from another computer until the user approves the permanent storage. The mechanism of the present invention affords the user the opportunity to view and approve the permanent storage of cookies on the user's computer. The mechanism accepts cookies or tag cookies as accepted is needed so that Web sites, which need the cookies, can function properly. The cookies are temporarily stored so that the data from the cookie is available to a Web site to allow the user to properly access Web sites requiring cookies. When the session for the browser terminates, part of the termination of the session includes presenting cookies received during the session to the user for a determination as to which cookie should be retained. Thus, the present invention provides a mechanism to

restrict access to resources on a user's computer. In this manner, the user is not required to approve the acceptance of a cookie each time a cookie is presented to the browser as in currently available systems.

5 It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in  
10 the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media  
15 include recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example,  
20 radio frequency and light wave transmissions. The computer readable media may take the form of coded formats that are decoded for actual use in a particular data processing system.

The description of the present invention has been  
25 presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. In the depicted examples, the cookie is  
30 presented as part of an HTTP request received at the browser. The mechanism of the present invention may be applied to other methods used to send cookies to a browser. For example, cookies embedded within HTML pages

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or Java scripts also may be handled using the process of the present invention. In each case, the cookies will be accepted and placed in a temporary storage and not in a permanent storage without approval from the user at a  
5 time when the session ends. Of course, this presentation and approval process may occur at other times other than the termination of the session depending on the particular implementation. For example, the user may initiate an approval or review process of cookies  
10 received during a session.

Further, the illustrated examples place the cookies in a temporary memory, such as a system random access memory. These cookies received during a session also may be placed in a other types of temporary storage, such as  
15 a temporary file that is deleted or emptied when the session terminates. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various  
20 modifications as are suited to the particular use contemplated.